GREAT RIVER HYDRO, LLC
MASSACHUSETTS
YEARLY OPERATIONAL PLAN
2019

Submitted by:
Great River Hydro, LLC

Prepared by:
Vegetation Control Service, Inc.

June 27, 2019

SUMMARY

In compliance with the Massachusetts Department of Agricultural Resources' (MDAR) Rights-of-Way Regulations (333 CMR 11.00), this Yearly Operational Plan (YOP) informs municipalities of Great River Hydro, LLC's intent to utilize state recommended herbicides on their rights-of-way.

The application of herbicides along the embankments of the power generation canal banks, access roads and conduit in Buckland, Monroe and Florida will be carried out within the specifications of our Integrated Vegetation Management program, outlined in our five year Vegetation Management Plan.

Our YOP identifies target vegetation; those areas within the ROWs that require treatment; the herbicides, rates and methods of application to be used; alternative control methods; the individual responsible for supervising the YOP, and the qualified contractor that will perform the application. It explains how sensitive areas; buffer zones and sites where herbicides are either restricted or not permitted are identified, appropriately marked, and protected. It addresses procedures for mixing, handling and loading of herbicide concentrates. Finally, it includes Herbicide Fact Sheets and Labels, a list of emergency resources and telephone numbers, and Maps of the ROWs marked with known state regulated sensitive areas.

Great River Hydro, LLC's 2019-2023 Five-Year Vegetation Management Plan (VMP) is available for review at the affected communities' Board of Health, Conservation Commission and Chief Elected Official (Select board) or upon request from the person designated herein as the person supervising the YOP.

Upon receipt of this YOP, the MDAR publishes a notice in the *Environmental Monitor*. Great River Hydro also provides a copy of the YOP and *Environmental Monitor* notice to the Board of Health, Conservation Commission and Chief Elected Official (Select board) in the affected municipalities. The MDAR allows a 45-day comment period on the proposed YOP beginning with the publication of the notice and receipt of the YOP and *Environmental Monitor* notice. A one page notice is also sent to all public water suppliers.

Additional public notification of herbicide application is made at least 21 days prior to the treatment(s) by a separate notice (sent concurrently with the 45 day notice). This Notice is made to the MDAR, Chief Elected Official (Select board), Board of Health, the Conservation Commission and the Municipal Public Water Supplier.

A Newspaper Notice will also be made at least 48 hours in advance of the treatment(s).

Any comments on this YOP should be made to the individual designated herein as the person supervising the YOP.

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I. INTRODUCTION

In compliance with the Commonwealth of Massachusetts' Right-of-Way Vegetation Management Regulation, 333 CMR 11.00, Great River Hydro, LLC (hereafter Great River Hydro) hereby submits a Yearly Operational Plan (YOP) that details our vegetation management program for 2019. The YOP is consistent with the terms and procedures set forth in Great River Hydro's 2019-2023 Five-Year Vegetation Management Plan (VMP) approved by the Massachusetts Department of Agricultural Resources (MDAR) in 2019 and all applicable state and federal regulations that mandate the management of utility rights-of-way.

The purpose of this YOP is to inform local communities, and the general public of Great River Hydro's intent to selectively apply Commonwealth of Massachusetts' recommended herbicides for use in regulatory mandated sensitive areas to target incompatible vegetation at the facilities listed in Section III and mapped in Appendix I.

The use of herbicides is an essential component of Great River Hydro's Integrated Vegetation Management (IVM) program (a combination of mechanical, chemical and biological methods). To implement this program, Great River Hydro contracts with experienced, licensed applicators, working under an on-site certified applicator, who must comply with the specifications set forth in the VMP and with all applicable state and federal regulations.

This approach reflects Great River Hydro's intent to prevent any unreasonable adverse effects to the environment and to the safety and health of animals and humans while supporting the ability to generate electric power on a regular and dependable basis.

II. CHAPTER 132B AND 333 CMR 11.00

Chapter 132b (Massachusetts Pesticide Control Act) was created to ensures a clear and uniform set of standards for the entire Commonwealth of Massachusetts ***in order to protect the public from the negative impacts that arise from fragmented, decentralized, sets of standards***. In this effort, the Commonwealth, through MDAR retains the sole right to regulate the use of pesticides, including herbicides, throughout Massachusetts. MDAR takes this responsibility extremely seriously and the regulations promulgated from Chapter 132b are stricter than Federal standards.

"The purpose of 333 CMR 11.00 is to establish a statewide and uniform regulatory process…*(333 CMR 11.01).*" 333 CMR 11.00 is the most comprehensive rights of way regulation in New England. It requires an Integrated Pest Management (in this case IVM) approach to right of way vegetation management; the establishment of standards and procedures to prevent unreasonable risks to humans or the environment, and a multi-layered system of public and municipal notification that requests input about environmentally and culturally *Sensitive areas*. All of this is outlined in Great River Hydro's VMP, annual YOPs, *The Environmental Monitor* Notice, 21 & 45 day notifications, Public Water Supplier notification and 48 hour newspaper notice which serve as guides for the public, state and municipal officials, vegetation management contractor and Great River Hydro personnel.

To ensure compliance with Chapter 132b and 333 CMR 11.00, MDAR performs routine inspections of rights-of-way treatment crews, retains chemists, and performs further tests before approving a limited list of herbicides approved for use in regulator sensitive areas (pursuant to 333 CMR 11.04 (1)(d)).

As detailed in the VMP and YOP, Great River Hydro's IVM program strictly adheres to all the requirements of Chapter 132b and 333 CMR 11.00. Great River Hydro only retains herbicide application treatment contractors that hold Massachusetts' Category 40 certifications and applicator licenses to apply pesticides, which require ongoing training to maintain. All sensitive areas are treated appropriately using either mechanical treatment methods or Commonwealth of Massachusetts recommended herbicides for use in sensitive areas.

III. LOCATION OF INTENDED HERBICIDE TREATMENT

Herbicide treatments in 2019 are scheduled along the embankments of the power generation canal banks, access roads, a boat landing and conduit in Buckland, Monroe and Florida, Massachusetts (Appendix I).

IV. IDENTIFICATION OF TARGET VEGETATION

Pursuant to the policy and intent set forth in Great River Hydro's VMP, all incompatible vegetation must be removed that obscures the ROW corridors and that grows tall enough to interfere with the safe, efficient and legal operation of power generation canals. The primary target is woody vegetation that impedes visual inspections and access to the canal embankments and service roads, followed by woody shrubs, vines, and noxious vegetation including invasive species and poisonous plants.

Incompatible species include, but are not limited to:

- Tree species such as Aspen, Beech, Birch, Cherry, Maples, Oak and Pines
- Shrubs such as Mountain Laurel, Speckled Alder, Staghorn Sumac, Maple-Leaf Viburnum and Witch Hazel
- Woody vines such as Bittersweet and Wild Grapes
- Other invasive, noxious or poisonous vegetation such as Poison Ivy, Blackberry, Multi-flora Rose and Autumn Olive.

Except where vegetation free conditions are required, compatible vegetation includes grasses, low growing herbaceous species and very low growing woody species such as sweet fern that generally don't interfere with the inspection and function of the ROW corridors. This desirable vegetation reduces the potential of erosion and creates a grass-herbaceous environment that competes with the target vegetation. Compatible vegetation at each facility depends upon its function therefore, vegetation free conditions are necessary along the stone rip-rap of the power generation canals to facilitate routine visual structure inspections as required by the Federal Energy Regulatory Commission. Grasses and herbaceous growth are encouraged on earthen dike walls.

V. DEFINITION, IDENTIFICATION AND TREATMENT OF SENSITIVE AREAS

Sensitive areas are those areas within the ROW in which public health, environmental concerns or agricultural interests warrant special protection to minimize the risk of unreasonable adverse effects. Prior to any herbicide applications, all sensitive areas will be identified and appropriately marked on maps and, when appropriate, flagged or marked in the field.

A. Control Strategies for Sensitive Areas

The following table diagrams the control strategies for sensitive areas. *These include No-Spray and Limited Spray Areas* and at a minimum the *Limited Spray Areas* require the use of herbicides on the *Sensitive Area Materials List* available at:

https://www.mass.gov/service-details/rights-of-way-sensitive-area-materials-list

Great River Hydro also follows the application restrictions in 333 CMR 11.04, including applications that use no more than the minimum labeled herbicide application rate for the control of target species.

TABLE I: CONTROL STRATEGIES FOR SENSITIVE AREAS[#]

Sensitive Area	No-Spray and Limited Spray Areas (feet)	Control Method	Restriction Code
Public ***Ground*** Water Supplies	400'	Mechanical Only	None
Primary Recharge Area	Designated buffer zone or 1/2 mile radius	Mechanical, Recommended Herbicides*	24 months
Public ***Surface*** Water Supplies (Class A & Class B)	100'	Mechanical Only	None
	100'-400'	Recommended Herbicides	24 months
Tributary to Class A Water Source, within 400' upstream of water source	100'	Mechanical Only	None
	100'-400'	Recommended Herbicides	24 months
Tributary to Class A Water Source, greater than 400' upstream of water source	10'	Mechanical Only	None
	10'-200'	Recommended Herbicides	24 months
Class B Drinking Water Intake, within 400' upstream of intake	100'	Mechanical Only	None
	100'-200'	Recommended Herbicides	24 months
Private Drinking Water Supplies	50'	Mechanical Only	None
	50'-100'	Recommended Herbicides	24 months
Surface Waters	10'	Mechanical Only	None
	10'-100'	Recommended Herbicides	12 months
Rivers	10' from mean annual high water line	Mechanical Only	None
	10'-200'	Recommended Herbicides	12 months
Wetlands	100' (treatment in wetlands permitted up to 10' of standing water)*[+]	Low-pressure Foliar, CST, Basal Recommended Herbicides	12 months
Inhabited Areas	100'	Recommended Herbicides	12 months
Agricultural Area (Crops, Fruits, Pastures)	100'	Recommended Herbicides	12 months
Certified Vernal Pools	10'	Mechanical Only when water is present	None
Certified Vernal Pool Habitat	10'-outer boundary of habitat	No treatment without written approval per 321 CMR 10.14(12)	
Priority Habitat	No treatment without written approval per 321 CMR 10.14(12)		

Restrictions "24 Months": A minimum of twenty-four months shall elapse between applications
"12 Months": A minimum of twelve months shall elapse between applications

*Massachusetts recommended herbicides for sensitive sites

[+]Per the *DFA Decision Concerning the Wetlands Impact Study* for utilities per 333 CMR 11.04(4)(c)(2).

B. Methods of Identifying Sensitive Areas

Prior to any herbicide application, sensitive areas will be identified and when necessary marked in the field by an experienced vegetation management treatment crew point person, by individuals trained in the identification of sensitive areas that require the use of GIS (geographic information systems) and GPS equipment, and/or by a Natural Heritage and Endangered Species Program of the Massachusetts Division of Fisheries and Wildlife (NHESP), approved botanist trained in the delineation of state-listed species.

Two simple descriptions guide the complex identification of the sensitive areas listed in 333 CMR 11.02: *Readily identifiable in the field* and *Not readily identifiable in the field*:

A. *Readily identifiable in the field areas* will be treated and marked according to all applicable restrictions listed in 333 CMR 11.00 and Great River Hydro's 5-year VMP. For example, these include no-chemical *sensitive areas* such as the 10 ft. buffer from the high water mark of a river.

B. *Not readily identifiable in the field areas* are identified by the use of the data marked on our maps and additional data collected in the YOP and notification processes before the time of treatment. For examples: Priority Habitats or within 400' of tributaries to a Class A water source.

The following resources will be used in the identification of sensitive areas:

1. Massachusetts Department of Environmental Protection water supply GIS mapping layers.
2. GIS maps and lists of identified private wells along the ROW.
3. Correspondence and input from municipalities within the consecutive 45 day YOP and 21 day municipal ROW notification review and comment periods.
4. A point person who verifies identified sensitive areas and any additional areas that may require special precautions.
5. NHESP data identifying priority habitat.

The YOPs contain maps with the most current data available at the time of printing. The maps are a resource and a tool for both the public and the applicators; therefore, they contain the appropriate public data needed to identify, mark and treat sensitive areas and are in compliance with all applicable regulations.

The map(s) include known sensitive areas available at the printing of this YOP. Some sensitive areas are included in the base USGS topographic maps, for example applicable Wetland Resource Areas (Rivers, Wetlands, etc.) The most current data available through MassGIS such as public water supplies, certified vernal pools and any data that Great River Hydro has collected to date on areas such as private wells are added on top of the USGS data. At the time of treatment, any additional sensitive areas collected will be added to the maps utilized by our vegetation management contractors. Note that Zone II's and

limited spray areas are not mapped since Great River Hydro only uses herbicides approved for use within this type of sensitive area in their right-of-way program. Also, according to the confidentiality agreement(s) between Great River Hydro, the contractor and the NHESP, Priority Habitat of State-Listed Species are not included on the YOP maps but are included on the treatment maps utilized by Great River Hydro and by the contractor.

C. Treatment in State-Listed Species Habitat

All vegetation management activities on Great River Hydro's ROWs will be conducted in compliance with 321 CMR 10.00. According to Section 10.14(12), "Vegetation Management must be carried out in accordance with a vegetation management plan [YOP] approved in writing by the Division [NHESP] prior to the commencement of work ....under the provisions of M.G.L. c.7, § 3B." In compliance with this exemption from the permit process, a copy of Great River Hydro's YOP for 2019 will be approved by NHESP.

Using the confidential GIS data sent to Great River Hydro by NHESP, applicable Priority Habitats will be identified in the field and vegetation management treatment crews will only conduct the appropriate vegetation management activities in these sensitive areas.

VI. PROPOSED HERBICIDE TREATMENT METHODS

Experienced, Massachusetts licensed applicators will perform the 2019 selective herbicide treatment on Great River Hydro's ROW corridors under the direct on-site supervision of a certified applicator. The application methods utilized will provide the most appropriate technique for the vegetation species, height & density and the site.

1. Foliar: The herbicide mix will be selectively applied while walking along the ROW via a backpack sprayer or with a handgun nozzle attached to a hose from a truck mounted supply tank. Both of these techniques are low pressure (less than 60 psi) and are applied directly to the foliage of target plants.

2. Cut Stump Surface Treatments may be used where an herbicide mix is applied directly to the cut surface of a stump, usually by a hand held squirt bottle when cutting target vegetation over 12 feet high or where foliage applications are not appropriate.

3. Low Volume Basal may be used where an herbicide mix is selectively applied to the lower portion of the plant stems. This technique can be used year round except during deep snow conditions that cover the target stems. It is typically used during the non-foliage season where target stems are easily identified without the interference of lush, tall grasses or ferns. This technique allows for extending the herbicide treatment period beyond the foliage season.

VII. PROPOSED HERBICIDES, CARRIERS, ADJUVANTS AND RATES

Only Commonwealth of Massachusetts recommended herbicides for use in sensitive areas—pursuant to 333 CMR 11.04 (1)(d)—will be used on all of Great River Hydro's ROWs. MDAR Herbicide Fact Sheets that explain technical information relative to the below herbicide concentrates are in Appendix II, and the manufacturer's labels are in Appendix III.

Table II: Tank Mixes: Foliage Applications:

Herbicides & Adjuvants	Active Ingredient	EPA Registration Number(s)	Mix Concentration (per 100 gals. water)	Estimated Application Rate Per Acre
Rodeo	Glyphosate	62719-324	3-5%	16-128 oz.
Garlon 4 Ultra	Triclopyr	62719-527	2-4%	16-128 oz.
Escort XP or Patriot	Metsulfuron-Methyl	432-1549 or 228-391	2-4 oz.	0.125-0.8 oz.
Arsenal Powerline or Polaris[1]	Imazapyr	241-431 or 228-534	0.125%-0.5%	2-8 oz.
Induce, Clean Cut, MSO, Aqua Fac or equivalent surfactant[2]	n.a.[3]	n.a.	0.125%-1%	1-16 oz.
Point Blank, Clasp or equivalent drift retardant	n.a.	n.a.	0.125%-0.5%	1-2 oz.
Carrier: Water	n.a.	n.a.	n.a.	n.a.

Table III: Tank Mix: Cut Surface Treatment:

Herbicides & Adjuvants	Active Ingredient	EPA Registration Number(s)	Mix Concentration (per 100 gals. water)	Estimated Application Rate Per Acre
Rodeo	Glyphosate	62719-324	40% to 50%	Per density of target stems
Arsenal Powerline or Polaris	Imazapyr	241-431 or 228-534	3%-5% (mixed with Rodeo)	Per density of target stems
Carriers: Water or non-freezing agent	n.a.	n.a.	n.a.	n.a.

Table IV: Tank Mix: Low-Volume Basal or Cut Surface Treatment:

Herbicides & Adjuvants	Active Ingredient	EPA Registration Number(s)	Mix Concentration (per 100 gals.)	Estimated Application Rate Per Acre
Garlon 4 Ultra	Triclopyr	62719-527	20%-30%	Per density of target stems
Polaris	Imazapyr	228-534	3%-5% (mixed with Garlon 4 Ultra)	Per density of target stems
Carrier: Arborchem's low odor basal oil or equivalent	n.a.	n.a.	n.a.	n.a.

[1] Imazapyr will not be applied on the same right-of-way in two consecutive years.
[2] Equivalent surfactants, drift retardants and basal oils will be used if those listed are no longer available or more effective alternatives become available.
[3] n.a.—not applicable

VIII. PROCEDURES FOR HANDLING, MIXING AND LOADING HERBICIDE CONCENTRATES

All herbicides will be handled, mixed and applied according to strict *Label Instructions* and in compliance with all applicable federal and state laws and regulations. All herbicide mixing should be done at the contractor's facilities and extreme care will be exercised during all mixing, handling and loading in order to prevent careless spills or splashes. No herbicide concentrates will be mixed, handled or loaded on a ROW within one hundred feet of a Sensitive Area.

IX. ALTERNATIVE CONTROL TECHNIQUES

Areas not treated or prohibited from herbicide use, such as protective buffers, will be maintained mechanically according to the specifications in the VMP. Hand cutting with power saws is the most common technique. Mowers mounted on tractors may also be used where terrain permits, in situations of extremely dense target vegetation.

X. THE COMPANY THAT WILL PERFORM THE HERBICIDE APPLICATIONS

Vegetation Control Service, Inc.
2342 Main Street
Athol, MA 01331
(978) 249-5348

XI. THE INDIVIDUAL RESPONSIBLE FOR SUPERVISING THE YOP

Mr. Timothy Harty, Environmental Specialist
Great River Hydro, LLC
Walpole Office
2 Killeen Street
North Walpole, NH 03609
(603) 445-6813

XII. EMERGENCY RESOURCES

Clean up Procedures

This section is offered as a general procedural guide for responding to chemical spills or related accidents (related accidents include but are not limited to fire, poisoning and vehicle accidents). The following is, therefore, a guide to the items that will be available to the applicator on site in the event of a chemical spill or emergency.

Although education and attention will constantly be directed at accident and spill prevention, in the event of a spill, immediate action will be taken to contain the spill and protect the spill area (the *Herbicide Spill Check List* below shall be available on-site to the applicator). Until remedied, the spill area will be protected by placing barriers, flagging or crew members at strategic locations, as appropriate. If a fire is involved, care will be taken to avoid breathing fumes from any burning chemicals.

Great River Hydro's contact in the case of a spill or accident

Timothy Harty: (603) 445-6813

Chemicals Spilled that Require Action

- Herbicides
- Bar and Chain Oil
- Motor and Hydraulic Oil/Fluids
- Diesel Fuel
- Gasoline
- Title 3 Hazmat Materials

Required Spill Response Equipment

- YOP with Emergency Contact List
- PPE (Personal Protective Equipment) per Product Label
- SDS (Safety Data Sheet)
- Product Label
- Product Fact Sheets (when applicable)
- Appropriate adsorbent material
- Shovel
- Broom
- Flagging
- Leak Proof Container
- Heavy-duty Plastic Bags

Personal Contact

In the event of **Personal Contact** with hazardous chemicals:

- Wash affected area with plenty of soap and water
- Change clothing which has absorbed hazardous chemicals
- If necessary, contact a physician
- If necessary, contact the proper emergency services
- If necessary, follow the procedures for Major or Minor Spills
- Avoid breathing the fumes of hazardous chemicals

Reference Tables (information subject to change as necessary)

Table V: Herbicide Manufacturers

MANUFACTURER	TELEPHONE NUMBER
Albaugh Inc.	(800) 247-8013
BASF Corporation	(800) 526-1072
Bayer Environmental Science	(800) 331-2867
Dow AgroSciences	(800) 992-5994
E.I. du Pont de Nemours and Company	(800) 931-3456
Monsanto	(314) 694-1000
Nufarm	(800) 345-3330

Table VI: State Agencies

STATE AGENCY	TELEPHONE NUMBER	SPECIAL INSTRUCTIONS
MDAR, Pesticide Program	(617) 626-1784	A.S.A.P. (within 48 hours)
Massachusetts Department of Environmental Protection, Emergency Response Section	(888) 304-1133	For emergencies involving reportable quantities of hazardous materials; required info: City/town, street address, site name (if applicable), material
MA Department of Public Health, Bureau of Environmental Health's Environmental Toxicology Program	(617) 339-8351	
Massachusetts Poison Information Centers	(800) 682-9211	For medical emergencies involving suspected or known pesticide poisoning symptoms

Table VII: Emergency Services:

EMERGENCY SERVICE	TELEPHONE NUMBER	SPECIAL INSTRUCTIONS
Fire/ Police	911	
ChemTrec	(800) 262-8200	
Clean Harbors	(800) 645-8265	
Pesticide Hotline	(800) 858-7378	PST: 8:00 am-12:00 pm, web: www.NPIC.orst.edu

Table 8: Municipal Contacts:

The towns of Buckland, Florida and Monroe are part of the Cooperative Public Health Service. The representative for all three towns is:

Andrea Crete, (413) 774-3167 Ext. 106

TOWN	TOWN HALL
Florida	(413) 662-2448
Monroe	(413) 424-5272
Buckland	(413) 625-6330

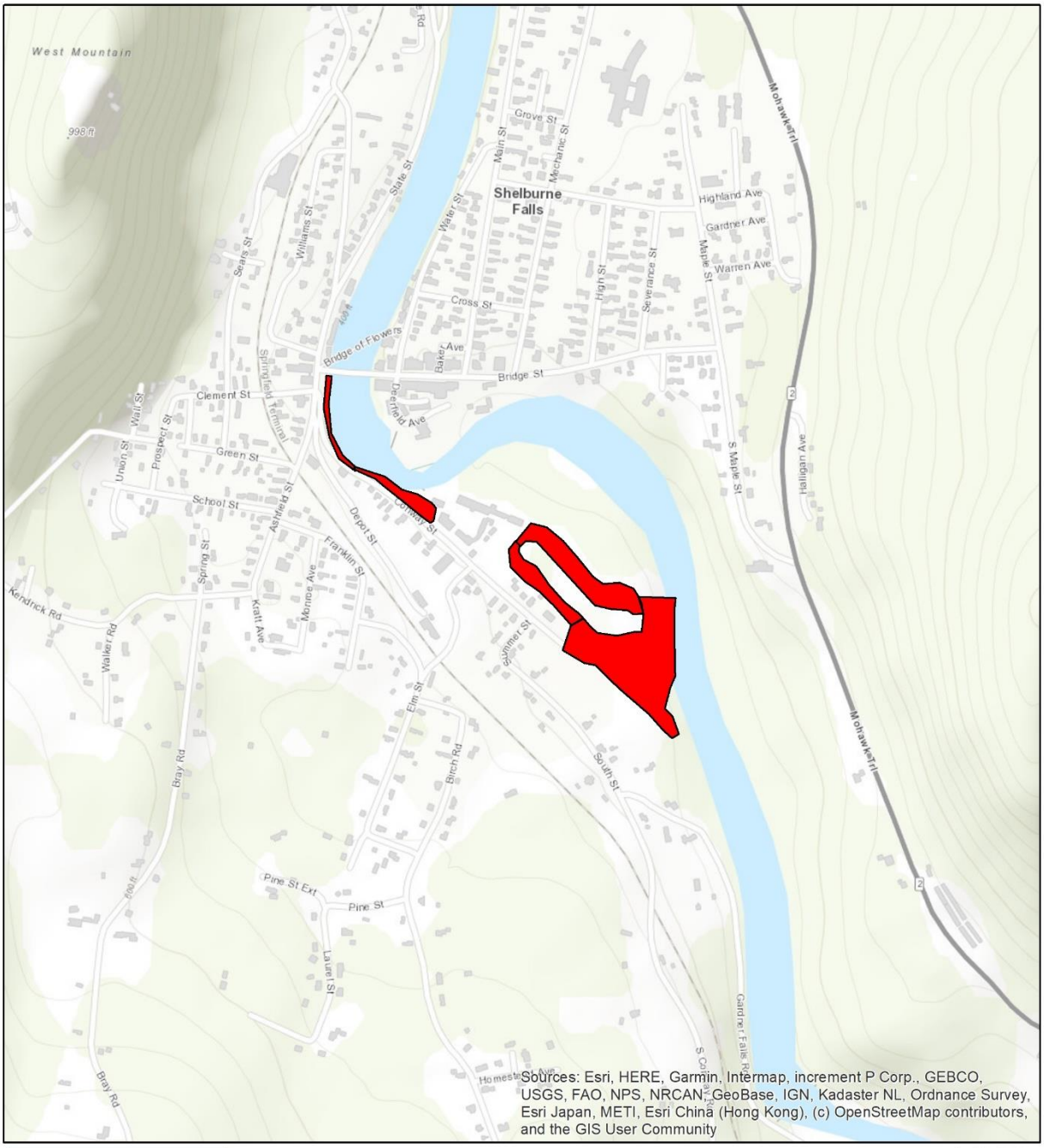
Table VIII: Herbicide Spill Check List

REPORTABLE SPILLS (Spills of reportable quantity of material):
FOLLOW STEPS 1-11

NON-REPORTABLE SPILLS: FOLLOW STEPS 1-4, 7-11 as appropriate & contact the Great River Hydro representative.

Order	ACTION		Done (√)
1	Use any and all Personal Protective Equipment (PPE) as directed by product label or Safety Data Sheet (SDS)		
2	Cordon-off spill area to unauthorized people and traffic to reduce the spread and exposure of the spill		
3	Identify source of spill and apply corrective action, if possible stop or limit any additional amounts of spilled product.		
4	Contain spill and confine the spread by damming or diking with soil, clay or other absorbent materials.		
5	Report spills of reportable quantity to:		
	MDAR, Pesticide Program	(617) 626-1700	
	Massachusetts Department of Environmental Protection, Emergency Response Section	1-888-304-1133	
6	If the spill cannot be contained or cleaned-up properly, or if there is a threat of contamination to any bodies of water, immediately contact any of the following applicable emergency response personnel:		
	local fire, police, rescue	911	
	Great River Hydro Representative: **Timothy Harty**	(603) 445-6813	
	Product manufacturer(s):		
	1	1	
	2	2	
	3	3	
	Chemtrec	(800) 424-9300	
	additional emergency personnel:		
7	Remain at the scene to provide information and assistance to responding emergency clean-up crews		
8	Refer to the sources of information relative to handling & cleanup of spilled product		
9	If possible, complete the process of "soaking up" with appropriate absorbent materials		
10	Sweep or shovel contaminated products and soil into leak proof containers for proper disposal at approved location		
11	Spread activated charcoal over spill area to inactivate any residual herbicide		

APPENDIX I: MAPS



Legend

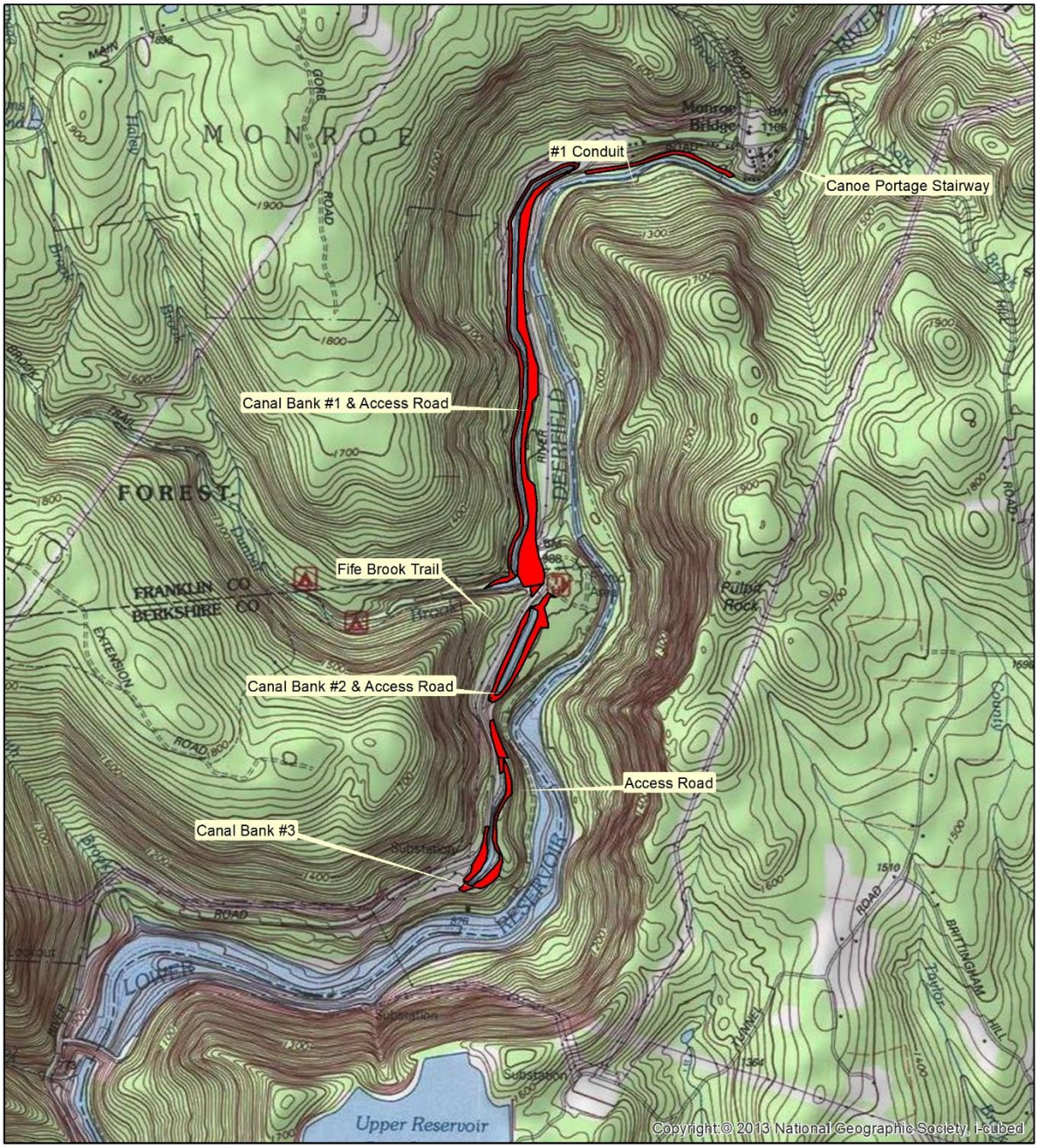
TransCanada 2019

No Public Wells

1,000 500 0 1,000 Feet

1:10,000

Great River Hydro 2019 YOP Buckland



Legend

TransCanada 2019

No Public Wells

2,500 1,250 0 2,500 Feet

1:24,000

Great River Hydro
2019 YOP
Monroe & Florida

APPENDIX II:
HERBICIDE FACT SHEET

https://www.mass.gov/service-details/rights-of-way-sensitive-area-materials-list

APPENDIX III:
HERBICIDE LABELS

ARSENAL POWERLINE:
HTTP://WWW.CDMS.NET/LDAT/LD86K002.PDF

ESCORT XP:
HTTP://WWW.CDMS.NET/LDAT/LDCFM000.PDF

GARLON 4 ULTRA:
HTTP://WWW.CDMS.NET/LDAT/LD7IN006.PDF

RODEO:
HTTP://WWW.CDMS.NET/LDAT/LD4TN013.PDF

PATRIOT:
HTTP://WWW.CDMS.NET/LDAT/LD6KH000.PDF

POLARIS:
HTTP://WWW.CDMS.NET/LDAT/LD8KR002.PDF